An Infrageneric Classification for *Poa* in North America, and Other Notes on Sections, Species, and Subspecies of *Poa*, *Puccinellia*, and *Dissanthelium* (Poaceae)

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ABSTRACT. An infrageneric classification for the genus *Poa* L. in North America, new taxa, combinations, names, hybrid status, and lectotypes are proposed for forthcoming treatments of the genus in the Americas. New names, combinations, and taxa are: *Dissanthelium atropidiforme* (Hackel) Soreng, *D. atropidiforme* var. *patagonicum* (Parodi) Soreng, *D. calycinum* subsp. *mathewsii* (Ball) Soreng, *Poa* sect. *Alpinae* (Hegetschweiler ex Nyman) Soreng, *P.* sect. *Dasypoa* (Pilger) Soreng, *P.* sect. *Sylvestres* V. L. Marsh ex Soreng, *P. arnowiae* Soreng, *P. chambersii* Soreng, *P. tovari* Soreng, *P. unilateralis* subsp. *pachypholis* (Piper) D. D. Keck ex Soreng, *P.* ×*gaspensis* Fernald, and *Puccinellia atacamensis* (Parodi) Soreng. Lectotypes are proposed for the following taxa: *Dissanthelium sclerochloides* Steudel ex E. Fournier, *Poa* [unranked] *Arenariae* Hegetschweiler, *Poa* [unranked] *Caespitosae* Fries ex Lange, *Poa* [unranked] *Fasciculiferae* Fries ex Lange, *Poa* [unranked] *Glareosae* Hegetschweiler, *Poa* [unranked] *Hydrophilae* Hegetschweiler, *Poa* [unranked] *Macranthela* K. Koch, *Poa* [unranked] *Micranthela* K. Koch, *Poa* [unranked] *Stoloniferae* Fries ex Lange, *Poa* [unranked] *Subbulbosae* Fries ex Andersson, *Poa* sect. *Incanae* V. Jirásek, *Poa* sect. *Nervosae* Rouy, *Poa* sect. *Obsoletae* Rouy, *Poa* sect. *Spizopoa* Dumortier.

In the course of working on *Poa* for North America (Soreng, 1985, 1990, 1991a, 1991b, 1986; Soreng & Hatch, 1983) it became apparent that the number of sections of *Poa* needed to be expanded, and the taxonomy of certain introduced Old World and circumboreal sections needed to be straightened out. Some of the changes proposed here stem from the results of chloroplast DNA (cpDNA) restriction site analyses for the genus. Other changes stem from a better understanding of the importance of the branching system to the taxonomy of *Poa*, and experience gained through having worked with the genus for 20 years. Physiographic divisions for distributions follow Takhtajan (1986). In addition, two new species are described, and five new combinations and one new name are proposed.

A. TWO NEW SECTIONS OF *POA*

Poa [subg. *Poa*] sect. **Dasypoa** (Pilger) Soreng, comb. et stat. nov. Basionym: *Dasypoa* Pilger, Bot. Jahrb. Syst. 25: 716. 1898. TYPE: *Dasypoa tenuis* Pilger (= *Poa conglomerata* Ruprecht ex Peyritsch).

Slender, caespitose, annuals or short-lived perennials, without rhizomes, to 30 cm tall; branching intravaginal; leaf sheaths weakly keeled to terete, not persisting on the plant for more than one season, without bulbous thickened bases, those of the uppermost culm leaves closed ¼–⅖ their length; leaf blades thin, flat, lax, at most sparsely scabrous above, with two lengthwise adaxial grooves, one on either side of the central vascular bundle; panicles densely flowered, cylindrical, somewhat lobed; spikelets 2–3-flowered; lemmas mostly 1–3 mm long, strongly to obscurely 5-veined, strongly keeled, sparsely pubescent (rarely glabrous); florets with one or three tufts of hair on the callus (callus rarely glabrous); palea keels scabrous and sometimes strigose below; flowers perfect, with three anthers 0.3–0.5 mm long.

Species included: *Poa conglomerata* Ruprecht ex Peyritsch, of the volcanic highlands of central Mexico and Guatemala, and *P. parviceps* Hackel and *P. scaberula* Hooker f. (= *P. conglomerata*), Andean and Chile-Patagonian regions of South America and Tierra del Fuego.

Watson and Dallwitz (1992) placed the genus *Dasypoa* Pilger in tribe Aveneae, without explanation, whereas Clayton and Renvoize (1986) placed it in synonymy within *Poa*. Tzvelev (1989) recognized the genus as a member of his broadly defined tribe Poeae (including Aveneae). On morphological grounds the type of the genus, *Dasypoa tenuis*, cannot be distinguished from *Poa*. *Poa conglomerata*, which is not morphologically distinct from *P. scaberula* (under which *D. tenuis* has been synonymized in the past), shares derived cpDNA restriction sites with cpDNA "group IV" species (see section D, below), including sections *Homalopoa*,

Madropoa, and *Dioicopoa* (Soreng, 1990). For discussion and synonymy of South American species of *P.* sect. *Dasypoa*, see Parodi (1962) [excluding *P. atacamensis* Parodi, = *Puccinellia* sp. (see section F, below), and *P. darwiniana* Parodi]. As there is little or no difference between the North American *P. conglomerata* and the South American *P. scaberula*, there is no reason to treat them as distinct species. Although Parodi counted *P. darwiniana* of Tierra del Fuego among related species, I have reservations about including it in section *Dasypoa*. This species lacks any hair on the florets, the lemmas are abruptly and stoutly short-awned (a peculiar trait for *Poa*), the ligules are lacerated, and the abaxial surface of the blades are abundantly hispidulous and have more than two grooves. *Poa darwiniana* may be related to *Poa flabellata* Lamarck, *P. cookii* (Hooker f.) Hooker f., and *P. ramosissima* Hooker f. of the Antarctic Islands, but more study is needed of this set of taxa, and I am not yet convinced *P. darwiniana* belongs in *Poa*.

Poa [subg. *Poa*] sect. **Sylvestres** V. L. Marsh ex Soreng, sect. nov. TYPE: *Poa sylvestris* A. Gray.

Plantae perennes caespitosae; innovationes plerumque pseudointravaginales; culmi vaginis connatis ad 1/10–apices; ligulae lacerae usque ad 4 mm longae; laminae planae sine pilis, apice non cucullato; panicularum rami scabri patuli, spiculis distalibus; callus arachnoideus (eo *P. autumnali* excepto); lemmae glabrae vel pubescentes, nervis lateralibus prominentibus, marginibus et apicibus anguste membranaceis pellucidis vel lactineis; flores hermaphroditi, antheris 0.5–2.0 mm longis.

Perennials; caespitose or rhizomatous (*Poa kelloggii*); shoots pseudointravaginal, or intravaginal (*P. autumnalis*), the pseudointravaginal prophylls mostly fused for more than half their length, and the first true shoot leaves usually without a developed blade; sheaths moderately to weakly keeled, those of the upper culm leaves with margins fused from 1/10 to over the whole length; ligules of upper leaves lacerate less than 4 mm long; leaf blades flat, soft, the tips acute, with costal and sometimes intercostal hooks, with one lengthwise adaxial groove on either side of the central vascular bundle, with prominent abaxial central nerves; panicles open, the main axis internodes elongate, over 3 cm long (except in *P. sylvestris*), the branches sparsely to densely scabrous on the angles, flowered in the distal 1/4 (1/3); spikelets 2–3-flowered, the third rachilla internode often more than 1.0 mm long; lemmas strongly keeled, strongly 5-veined, the narrow hyaline apex and margins clear or whitish, often acuminate, but sometimes obtuse and blunt, usually glabrous throughout, less often sparsely villous only on the keel (*P. alsodes*), or pubescent on the keel and marginal nerves (*P. autumnalis* and *P. sylvestris*), and rarely between the nerves (*P. autumnalis* and *P. sylvestris*); callus with a single dorsal web of crinkled hairs (glabrous in *P. autumnalis*); flowers perfect, anthers 0.5–2.0 mm long.

Species included: *Poa alsodes* A. Gray, *P. autumnalis* Muhlenberg, *P. kelloggii* Vasey, *P. marcida* Hitchcock, *P. saltuensis* Fernald & Wiegand, *P. sylvestris* A. Gray. All the species are native to North America, principally occurring in the Atlantic Region, Appalachian Province, with a secondary distribution in the Coast Ranges of the Vancouverian Province of the Rocky Mountain Region.

Chloroplast DNA restriction site data (for *Poa alsodes*, *P. autumnalis*, and *P. saltuensis*) suggest that this group is old and early diverging within *Poa* (Soreng, 1990). Members of the section examined have distinctly different chloroplast restriction site patterns from other sections, except *P.* sect. *Arctopoa* (Grisebach) Tzvelev (Soreng, 1990). *Poa* sect. *Sylvestres* is morphologically and ecologically far removed from the arctic and mainly Asian, halophytic *P.* subg. *Arctopoa*. Members of *P.* sect. *Sylvestres* are primarily restricted to rich forest soils with a strong deciduous tree component. They occur in low mountains of eastern and far western North America, and are perhaps a relictual element of a mid-Tertiary vicariance event between North American and Laurasian *Poa*.

New cpDNA restriction site data suggest *Poa marcida* Hitchcock belongs to this group (Soreng, unpublished). Morphologically *P. marcida* and *P. kelloggii* Vasey are not separable from the eastern North American members of the section. Although *P. bolanderi* Scribner has similar spikelets and lacks pubescence on the lemma, it is excluded because it is an annual and has extravaginal branching. Despite the section's putatively early origin within the genus, the species do have the single web on the back of the callus, typical of many species of *Poa*, but absent outside the genus (with one exception; see comments under *Dissanthelium* in section F, below). The morphological boundaries of *P.* sect. *Sylvestres* blur into *P.* sect. *Homalopoa*, and to some extent *P.* sect. *Oreinos* Ascherson & Graebner. The following species are difficult to assign to these sections on morphology alone: *P. autumnalis*, *P. chapmanniana* Scribner, *P. howellii* Vasey & Scribner, *P. laxiflora* Buckley, *P. leptocoma* Trinius s. str., *P. wolfii* Scribner; more work is needed to understand the affinities of these species.

B. On *Poa* Section *Dioicopoa*

The infrageneric nomenclature and taxonomy of the following group need clarification of rank.

Poa [subg. *Poa*] sect. **Dioicopoa** (E. Desvaux) Bentham, J. Linn. Soc., Bot. 19: 125. 1881. Basionym: *Poa* [unranked] *Dioicopoa* E. Desvaux, in C. Gay, Flora of Chile, 6: 413. 1853. *Poa* subg. *Dioicopoa* (E. Desvaux) J. R. Edmondson, J. Linn. Soc., Bot. 76: 331. 1978. TYPE: *Poa chilensis* Trinius (= *P. denudata* Steudel) (lectotype, designated by Keng (1959: 163)).

Species dioecious, different sex plants slightly dimorphic or not; perennials, rhizomatous or caespitose and sometimes with moderately bulbous thickened sheaths at the base of the plant; branching extra- and intravaginal; uppermost culm sheaths closed only near the base or up to ⅔ the length; leaf blades glabrous, flat or folded, with two lengthwise adaxial grooves, one on either side of the central vascular bundle; panicles dense, cylindrical to narrowly lanceolate or ovate, often somewhat lobed; spikelets numerous, crowded; lemmas strongly keeled, with long silky hairs on the keel and marginal and sometimes lateral veins, or glabrous, the pubescence of pistillate florets often much more abundant than that on staminate florets and always [?] present, lemmas of staminate florets sometimes glabrous; callus hairs long and plicate (not woolly as in most *Poa*, except in *P. hubbardiana*, where the copious hairs surround the callus but are still longer and more concentrated beneath the keel and marginal nerves, and *P. bergii*; rarely straight, except in *P. pogonantha*, and less so in *P. tristigmatica*), and, when present, originating in tufts from three points (below the keel, and below each marginal vein); anthers in staminate plants 1.5–3(4.5) mm long.

Species included: *Poa alopecurus* (Gaudichaud ex Mirbel) Kunth, *P. arachnifera* Torrey, *P. arechavaletae* Parodi, *P. barrosiana* Parodi, *P. bergii* Hieronymus and var. *chubutensis* Spegazzini, *P. boecheri* Parodi, *P. boelckei* Nicora, *P. bonariensis* (Lamarck) Kunth, *P. buchtienii* Hackel, *P. calchaquiensis* Hackel, *P. chilensis* Trinius (= *P. denudata* Steudel), *P. commersonii* Franchet (= *P. rigidifolia* Steudel), *P. curva* Nees (= *P. tristigmatica* E. Desvaux), *P. decolorata* Pilger (= *P. resinulosa* Nees ex Steudel), *P. denudata* Steudel, *P. dolichophylla* Hackel, *P. dusenii* Hackel, *P. eligulata* Hackel, *P. fuegiana* (Hooker f.) Hackel ex Dusén (= *P. alopecurus* subsp. *fuegiana* D. M. Moore & Doggett), *P. hubbardiana* Parodi, *P. ibari* Philippi, *P. iridifolia* Hauman, *P. lanigera* Nees, *P. lanuginosa* Poiret, *P. ligularis* Nees, *P. megalantha* (Parodi) Herter, *P. montevidensis* Arechavaleta, *P. nahuelhuapiensis* Nicora, *P. obvallata* Steudel (= *P. tristigmatica* E. Desvaux), *P. pachypogon* Nees (= *P. tristigmatica* E. Desvaux), *P. patagonica* Philippi, *P. patagonica* var. *neuquina* Nicora, *P. pedersenii* Nicora, *P. pilcomayensis* Hackel, *P. pilcomayensis* var. *calamagrostidea* Hackel, *P. poecila* Philippi, *P. pogonantha* (Franchet) Parodi (= *P. alopecurus* subsp. *fuegiana* D. M. Moore & Doggett), *P. prichardii* Rendle, *P. resinulosa* Nees ex Steudel, *P. reitzii* Swallen, *P. rigidifolia* Steudel, *P. schizantha* Parodi, *P. sellowii* Nees, *P. shuka* (Spegazzini) Parodi, *P. spiciformis* (Steudel) Hauman & Parodi (= *P. poecila* Philippi), *P. stuckertii* (Hackel) Parodi, *P. stuckertii* var. *megalantha* Parodi (= *P. megalantha* (Parodi) Herter), *P. subaristata* Philippi (= *P. tristigmatica* E. Desvaux), *P. superata* Hackel, *P. superbiens* (Steudel) Hauman & Parodi, *P. trachyantha* Hackel, *P. tristigmatica* E. Desvaux, *P. umbrosa* Trinius (= *P. sellowii* Nees), *P. uruguayensis* Parodi, and *P. vaginiflora* Steudel (= *P. denudata* Steudel).

In caespitose species the sheaths at the bases of plants may be moderately bulbous and indurate. Upper culm leaf sheaths may be closed only near the base, or up to ⅔ their length. An unusually high degree of variation exists in the length that the sheath is open in many species of *P.* sect. *Dioicopoa*, when compared to most other species of *Poa*. This variation comes from the tendency of the sheath margins to fuse for irregular distances within the region of overlapping folds, whereas in most other species of *Poa* the margins fuse where they meet or just above the lower end of the overlap. The species of the section differ from the dioecious members of *P.* sect. *Madropoa* chiefly in the absence of adaxial pubescence on the leaf blades and the presence of three tufts of plicate hairs on the calluses of lemmas. Although there was no chloroplast DNA restriction site support for or against the monophyly of *P.* sect. *Madropoa*, restriction site analysis showed *P.* sect. *Dioicopoa* to be monophyletic and to be derived from the same group of species that gave rise to *P.* sect. *Madropoa* (Soreng, 1990, 1991a).

The section contains some 50 dioecious species mainly from the Chile-Patagonian Region of South America, and one from the southern Great Plains of North America (Anton & Connor, 1995). *Poa arachnifera* probably arrived in North America from South America, as its lower polyploid relatives occur there. The rank of section is preferable, since to treat *Dioicopoa* as a subgenus would make *Poa*

subg. *Poa* paraphyletic (Soreng, 1990). *Poa* subg. *Poa*, as recognized here, encompasses all species of *Poa*, except those belonging in *P.* subg. *Arctopoa* and *P.* subg. *Andinae* Nicora.

The formal rank of *Poa* [unranked] *Dioicopoa* E. Desvaux remained to be established until Bentham (1881) cited it as a section of *Poa*. Bentham stated that without more detailed study he could not divide the genus into natural groups, but several genera and sections had previously been proposed that apply to the genus *Poa*. Hackel (1887: 73) clearly applied it in the rank of section. Although Anton (1978) later took it up as Hackel's section, other authors used it as unranked or at the rank of subgenus. Nannfeldt (1935: 7) mistakenly began its use as a subgenus, citing Hackel as having "divided it into three subgenera, viz. *Eupoa*, *Dioicopoa*, and *Pseudopoa*." Parodi (1950: 182, apparently his first use of *Dioicopoa* with a stated rank), Torres (1970), and Nicora (1978) explicitly treated it as a subgenus, without citing the basionym. Edmondson (1978), inadvertently, but effectively, first validated it in the rank of subgenus.

Keng (1959) lectotypified *Poa* sect. *Dioicopoa* with *P. chilensis* Trinius. However, the two species he cited as members of the section from China (*P. pleurinodis* Keng ex Keng f. [= *P. grandis* Handel-Mazzetti], and a second species that remains a nomen nudum) are not dioecious, nor are they in my opinion directly allied to *Dioicopoa*. These two species are at least superficially close to species of the *P. nervosa* Vasey complex of North America in morphology, and also in apparently possessing a partially gynodioecious breeding system (Soreng & Hatch, 1983; Soreng, 1985).

Four South American dioecious species have thick, folded, rigid leaf blades, more like *Poa* sect. *Madropoa* than other species of section *Dioicopoa*, and lack a web on the lemma callus. *Poa cumingii* Trinius, *P. hueca* Parodi, *P. holciformis* J. Presl (including *P. chilensis* sensu E. Desvaux (not Trinius) and its var. *robustior* Philippi), and *P. indigesta* Parodi (the former three of *Dioicopoa*, "grupo Holicformes," Parodi, 1950: 182) seem better placed in *P.* sect. *Madropoa*. *Poa cumingii* (including *Distichlis ammobia* Philippi) may be closely allied to *P. douglasii* Nees of North America (Beetle, 1955; pers. obs.).

Also described as dioecious *Poa* from South America are: *P. araucana* Philippi, *P. dialystostachya* Philippi, *P. gayana* E. Desvaux, *P. pallens* Poiret, *P. paposana* Philippi, *P. stachyodes* Philippi, *P. tricolor* Nees ex Steudel, and *P. valdiviana* Philippi. I have not seen type or other material of *P. araucana* or *P. valdiviana*. The others are members of *P.* sect. *Dioicopoa*, but may be synonymous with one or more of the above species. *Poa stachyodes* appears to be a staminate specimen of *P. dialystostachya*. *Poa paposana* may be the same as *P. buchtienii*, and if so would be an older name for that species.

Species belonging to *Poa* subg. *Andinae* and *P. flabellata* Lamarck and relatives are excluded from *P.* sect. *Dioicopoa*. Species of *P.* subg. *Andinae* are gynodioecious, and all have other morphological features unlike *P.* sect. *Dioicopoa*, including leaf blades with more than two adaxial grooves, and lemmas with a crown of hairs on their calluses, or glabrous calluses, rather than isolated tufts of hairs (except for *P. robusta*). Species of *P.* sect. *Dioicopoa* historically have been described in *Arundo*, *Distichlis*, *Festuca*, *Koeleria*, and *Trisetum*, as well as *Poa*, but I have not attempted to gather together heterogeneric synonyms. Moreover, the above listing of species included in the section is intended only as a summary of past usage. The section needs revision.

C. On *Poa* Sections of Ascherson and Graebner

The correct names for some sections of *Poa* introduced from Europe need clarification. Ascherson and Graebner (1900) began their landmark treatment of *Poa* by discussing older classifications of *Poa* developed by Hegetschweiler (1838) and Nyman (1882), explicitly calling previously unranked taxa "Sectionen." Had they accepted these older names they would have effectively established previously unranked legitimate infrageneric names in the rank of section. However, they explicitly rejected those taxa and went on to produce their own classification for the genus, included elements of the older unranked groups within their own new sections, and did not mention those unranked groups of Hegetschweiler or Nyman again (with one exception; *Poa* [unranked] *Vagantes* Nyman (1882: 833), nom. nud., no type cited, was placed in *P.* sect. *Ochlopoa* Ascherson & Graebner, 1900). The dismissal of the groups of Hegetschweiler and Nyman in favor of their own sections was primarily a consequence of using the old circumscription method versus the modern type method, as the older infrageneric taxa tended to be very heterogeneous (Ascherson & Graebner, 1900).

These older infrageneric taxa are reiterated here to clarify their status. Some are naked names, some are superfluous, some are untypified, and others are automatically typified. Several of these group names were accepted by Stapf (1896) and Lindman

(1926), but because those authors did not assign them rank they remained unranked. Lindman (1926) considered some of the older names to have priority over those of Ascherson and Graebner (1900).

The Hegetschweiler names are all listed with full citation in the classification for *Poa* in North America, section D, below, where their typification is also dealt with.

Poa [unranked] *Alpinae* Hegetschweiler ex Nyman: Hegetschweiler provided the description and Nyman the name.

Poa [unranked] *Arenariae* Hegetschweiler: Hegetschweiler's *Arenariae* is apparently a descriptive name, because it is not taken from any of the three homonyms, *Poa arenaria* Retzius, Lamarck, or Willdenow ex Sprengel, as none of those were included, nor are synonyms of any of those species included in the group. *Arenariae* initially included only *P. bulbosa* and *P. concinna* Gaudin (≡ *P. perconcinna* J. R. Edmondson), two members of the *P. bulbosa* complex, and one of these should be selected as the lectotype (see *P.* sect. *Bolbophorum* in section D, below).

Poa [unranked] *Glareosae* Hegetschweiler: *Glareosae* is not based on any name in *Poa. Poa glareosa* (Trinius) Kunth (= *Eragrostis articulata* (Shrank) Nees), from Brazil, is nomenclaturally, morphologically, and geographically unrelated to any of the species Hegetschweiler included in his group.

Poa [unranked] *Hydrophilae* Hegetschweiler: The name *Hydrophilae* might have been derived from *P. hydrophila* Thuillier ex Steudel (nom. inval., as a synonym of *Poa serotina* Ehrhart), or *Poa hydrophila* Persoon, both of which are synonyms of *Poa palustris* L. Hegetschweiler included *P. palustris* Hegetschweiler (hom. illeg., non L.) in his group and *P. fertilis* Hegetschweiler (hom. illeg., non Host), both of which are probably synonymous with *P. palustris* L. Although Hegetschweiler specified "nob." after each of the latter illegitimate species, it appears that he intended it in the sense of emended description, not as new species. Thus, it is possible to infer that *P. hydrophila* Persoon should be the automatic type of the group. However, as Hegetschweiler made no mention of that name, it seems appropriate to select one of the other included species as the lectotype (see synonymy under *Poa* sect. *Pandemos* in section D, below).

Poa [unranked] *Nemorales* Hegetschweiler: The automatic type is the same as the (later designated) lectotype for the older section, *Poa* sect. *Stenopoa* Dumortier, which has priority.

Poa [unranked] *Pratenses* Hegetschweiler: This has as the automatic type the same species that is the automatic type of *Poa* sect. *Poa.*

Poa [unranked] *Silvaticae* Hegetschweiler ex Nyman: Hegetschweiler provided the description and Nyman the name. The automatic type is the same as the (later designated) lectotype for the older section, *Poa* sect. *Homalopoa* Dumortier, which has priority.

Ascherson and Graebner (1900) also mentioned three legitimate sections of Dumortier, but used only one of them in their formal classification. These were initially published as sections. Two of them were later lectotypified, and one lectotype is established in section D, below.

According to J. R. Edmondson (1975: 25), Ascherson and Graebner's (1900) ranks of infrageneric taxa are explicitly "indicated by means of a typographical convention of symbols, which was explained on the fly-leaf of the unbound parts of the Flora." Edmondson (1980) accepted these as Ascherson and Graebner's sections. In case there remains any doubt, Jirásek (1934, 1935a) also recognized these as Ascherson and Graebner's sections. Others (e.g., Tzvelev, 1972, 1974, 1976; Soreng, 1990), who were unaware of these fly-leaf notes, have considered Ascherson and Graebner's sections as unranked and attributed the rank of section to Jirásek (1935a).

Since there has been much confusion surrounding the ranks used by Ascherson and Graebner (1900) in the genus *Poa*, their classification is outlined below:

Poa subg. *Eupoa* Hackel 1889 (Ascherson & Graebner, 1900: 387) (nom. superfl., ≡ *Poa* subg. *Poa*).
(Unranked?) *Leptoneurae* Döll, Fl. Baden 1: 172. 1855 (Ascherson & Graebner, 1900: 387).
Poa sect. *Ochlopoa* Ascherson & Graebner, Syn. Mitteleur. Fl. 387. 1900 (species 1) TYPE: *Poa annua* L. (Ascherson & Graebner included: *Poa* [unranked] *Annuae* Fries ex Andersson, Pl. Scand. Gram. 47. 1852; Döll, Fl. Baden 172. 1855).
Poa sect. *Bolbophorum* Ascherson & Graebner, Syn. Mitteleur. Fl. 391. 1900.
Gesammtart *Poa bulbosa* L. (Ascherson & Graebner, 1900: 391; species 2–6).
Poa sect. *Oreinos* Ascherson & Graebner, Syn. Mitteleur. Fl. 400. 1900.
Gesammtart *Poa laxa* Haenke (Ascherson & Graebner, 1900: 401; species 7–8).
Poa sect. *Cenisia* Ascherson & Graebner, Syn.

Mitteleur. Fl. 404. 1900 (species 10). TYPE: *Poa cenisia* Allioni.

Poa sect. *Glaucopoa* Ascherson & Graebner, Syn. Mitteleur. Fl. 405. 1900 (species 11). TYPE: *Poa caesia* Smith (= *Poa* sect. *Stenopoa* Dumortier).

Poa sect. *Hylopoa* Ascherson & Graebner, Syn. Mitteleur. Fl. 406. 1900 (≡ *Poa* sect. *Stenopoa* Dumortier).

Gesammtart *Poa nemoralis* L. (Ascherson & Graebner, 1900: 407; species 12–14).

Poa sect. *Tichopoa* Ascherson & Graebner, Syn. Mitteleur. Fl. 419. 1900 (species 15). TYPE: *Poa compressa* L.

Hybrid (Ascherson & Graebner, 1900: 421; species 16).

(Unranked?) *Pachyneurae* Ascherson, Fl. Brand. I: 847. 1864. (Ascherson & Graebner, 1900: 422).

Poa sect. *Homalopoa* Dumortier, Observ. Gramin. Belg. 110, 113. 1823. (Ascherson & Graebner, 1900: 422; species 17–18).

Poa sect. *Pandemos* Ascherson & Graebner, Syn. Mitteleur. Fl. 425. 1900. Nom. superfl. as circumscribed.

Gesammtart *Poa trivialis* L. (Ascherson & Graebner, 1900: 425; species 19–20).

Poa pratensis L. (Ascherson & Graebner, 1900: 428, species 21) (in *P.* sect. *Pandemos*, but not in Gesammtart *Poa trivialis*).

Hybrid (Ascherson & Graebner, 1900: 434; species 22).

Poa sect. *Pseudofestuca* Ascherson & Graebner, Syn. Mitteleur. Fl. 434. 1900 (= *Bellardiochloa* Chiovenda). TYPE: *Poa violacea* Bellardi (= *B. variegata* (Lamarck) Kerguélen).

Poa subg. *Psilantha* (K. Koch) Boissier, Fl. Orient. 5: 599. 1883. *Poa* [unranked] *Psilantha* K. Koch, Linnaea 21: 405. 1848 (= *Eragrostis* Wolf). TYPE: *Poa collina* (Trinius) K. Koch (≡ *Eragrostis collina* Trinius).

Under each section with more than one species included, except *Homalopoa*, there is one "Gesammtart" species listed. The German word Gesammtart (spelled with one m today) means the whole, or in the broadest concept. I take this Gesammtart species to represent the authors' concerted effort to pin down the section name, and thus to be the automatic type. This argument is made stronger by the fact that the authors provided Greek names for their sections that are derived from the Latin Gesammtart species epithets. (Note: *Poa* sect. *Pseudofestuca* and *Poa* subg. *Psilantha* belong to other genera.)

Although the *Poa bulbosa* and *P. alpina* groups have been placed as subsections of *P.* sect. *Poa* (Tzvelev, 1974, 1976), subsections of *P.* sect. *Bolbophorum* (Jirásek, 1935a), or together in *P.* sect. *Bolbophorum* (Ascherson & Graebner, 1900; Edmondson, 1978), molecular data suggest they are more remotely related within *Poa*, neither belonging to section *Poa* (Soreng, 1990; see cpDNA groups in section D, below). Thus, it is necessary to establish the correct names for the sections to which these species complexes belong, and this depends on the typification of *P.* sect. *Bolbophorum.*

It may be argued that *Poa* sect. *Bolbophorum* is automatically typified by *P. bulbosa* (D. Nicolson, pers. comm.), or not (R. Korf, pers. comm.). If this is automatic, as I have argued above, then the subsequent lectotypification by Edmondson (1978), on *P. alpina*, is contrary to the Code (Greuter et al., 1994) and should be rejected. In this case a new sectional name is needed for the *Poa alpina* complex.

If one does not accept that *Poa* sect. *Bolbophorum* is automatically typified, then the lectotype of *P. alpina* stands. In this case the *Poa bulbosa* complex would need a new sectional name.

It appears that Lindman (1926) was the next author to employ an infrageneric classification of *Poa.* This 26-year gap in the usage of infragenera in *Poa* is problematic in that other authors may have picked up any of these or additional sectional names in the meantime. However, I have searched many publications and not yet found intervening applications. In Lindman's outline of *Poa* infrageneric taxa, although one of Ascherson and Graebner's names was accepted, *Bolbophorum* species were divided among *Arenariae* and *Alpinae.* The rank was not explicitly stated by Lindman, and no new infrageneric combinations were made. Hermann (1939: 456) called the *P. bulbosa* group s. str., "*Poa* sect. *Bulbopoa,*" but that name is invalid as it was published without Latin. As no other alternative sectional names are available for either taxon, I propose the following taxonomic treatment.

Poa sect. **Bolbophorum** Ascherson & Graebner, Syn. Mitteleur. Fl. 391. 1900. TYPE: *Poa bulbosa* L. [lectotypification on *P. alpina* L., by J. R. Edmondson (1978: 331) is rejected here as unnecessary and contrary to the original intent].

Synonyms: (see section D, below).

Densely caespitose perennials, without rhizomes;

internal sheaths at the base of shoots indurate, thickened, with accumulations of hemicellulose, bulbous; leaf blades thin, lax, tending to wither early in the season, with one lengthwise adaxial groove on either side of the central vascular bundle; lemmas strongly keeled, pubescent or glabrous, the callus with a single dorsal tuft of woolly hairs or glabrous; palea keels scabrous, sometimes pilose below; flowers perfect, anthers 1–2 mm long.

Species included: *Poa akmanii* Soreng, P. Hein & H. Scholz, *P. bulbosa* L., *P. bactriana* Roshevits, *P. cephalonica* H. Scholz, *P. densa* Troitsky, *P. eigii* Feinbrun, *P. pelasgis* H. Scholz, *P. perconcinna* J. R. Edmondson, *P. perligularis* H. Scholz, *P. pitardiana* H. Scholz, *P. pseudobulbosa* Bor, *P. sinaica* Steudel, *P. timoleontis* Heldrich ex Boissier, and *P. vvedenskyi* Drobow.

The species are mainly native to the Mediterranean Region, with a secondary center in the Irano-Turanian Region. *Poa bulbosa* is widely introduced. The species are generally early spring-flowering in the Mediterranean Region. Several comparative studies of leaf and root trans-sectional anatomy have been made that differentiate between *P.* sect. *Bolbophorum* and sect. *Alpinae* (Buschmann, 1942; Vukolov, 1928, 1929; Jirásek, 1935b).

Poa [subg. *Poa*] sect. **Alpinae** (Hegetschweiler ex Nyman) Soreng, comb. et stat. nov. Basionym: *Poa* [unranked] *Alpinae* Hegetschweiler [1838: 84, providing the description] ex Nyman, Consp. Fl. Eur., part 4, 835. 1882. TYPE: *Poa alpina* L.

Synonyms: (see section D, below).

Densely caespitose perennials, without rhizomes; branching intravaginal; sheaths strongly overlapping at the base, tending to persist for more than one season (not bulbous and thickened), those of the uppermost culm leaves closed over ca. ¼ the length; leaf blades flat or folded, strict, glabrous, with one lengthwise adaxial groove on either side of the central vascular bundle; lemmas pubescent, the callus generally glabrous; palea keels scabrous, sometimes villous in part; flowers perfect, the anthers 1.2–2 mm long.

Species included: *Poa alpina* L., *P. badensis* Haenke ex Willdenow, *P. ligulata* Boissier, *P. media* Schur, *P. pumila* Host, *P. molinerii* Balbis, *P. thessala* Boissier & Orphanides.

Although *P. alpina* is circumboreal in distribution, these are mainly mountain species of the Mediterranean Region, and mountainous European provinces of the Circumboreal Region.

D. Infrageneric Classification for *Poa* in North America North of Mexico

Following is an outline of infrageneric taxa for *Poa* in North America. References to V. L. Marsh refer to unpublished names used in his 1950 dissertation and in Marsh (1952). Chloroplast DNA groups correspond to clades resolved using restriction site data (Soreng, 1990):

(cpDNA group I)

Poa subg. **Arctopoa** (Grisebach) Probatova, Novosti Sist. Vyss. Rast. 8: 34. 1971. Basionym: *Glyceria* sect. *Arctopoa* Grisebach, in Ledebour, Fl. Ross. 4: 392. TYPE: *Poa glumeris* Trinius (= *P. eminens* J. Presl).

Poa sect. **Arctopoa** (Grisebach) Tzvelev, Arktich. Fl. SSSR 2: 121. 1964. Basionym: *Glyceria* sect. *Arctopoa* Grisebach, in Ledebour, Fl. Ross. 4: 392. TYPE: *Poa glumeris* Trinius (= *P. eminens* J. Presl).

Poa subg. **Poa**

Poa sect. **Sylvestres** V. L. Marsh ex Soreng, Novon 8: 188. 1998. TYPE: *Poa sylvestris* A. Gray.

(cpDNA group II)

Poa sect. **Alpinae** (Hegetschweiler ex Nyman) Soreng, Novon 8: 193. 1998. Basionym: *Poa* [unranked] *Alpinae* Hegetschweiler ex Nyman, Consp. Fl. Eur., part 4, 835. 1882. TYPE: *Poa alpina* L.

Synonyms:

Poa subsect. *Caespitosae* V. Jirásek, Věstn. Král Ceské. Společn. Nauk, Tř. Mat.-Přír. 2: 3. 1935. TYPE: *Poa alpina* L. (lectotype, designated by Tzvelev (1974: 25)).

Poa ser. *Alpinae* Roshevits, Fl. URSS 2: 411. 1934. TYPE: *Poa alpina* L.

Poa [unranked] *Subbulbosae* Fries ex Andersson, Pl. Scand. Gram. (Fasc. 2) 45. 1852. TYPE: *Poa alpina* L. (lectotype, selected here).

(cpDNA group III)

Poa sect. **Ochlopoa** Ascherson & Graebner, Syn. Mitteleur. Fl. 387. 1900. TYPE: *Poa annua* L.

Synonyms:

Poa [unranked] *Micranthela* K. Koch, Linnaea 21: 404. 1848. TYPE: *Poa annua* L. (lectotype, selected here).

Poa [unranked] *Annuae* Fries ex Andersson, Pl. Scand. Gram. 47. 1852. TYPE: *Poa annua* L.

(cpDNA group IV)

Poa sect. **Poa**. TYPE: *Poa pratensis* L.

Synonyms:

Poa [unranked] *Macranthela* K. Koch, Linnaea 21: 404. 1848. TYPE: *Poa pratensis* L. (lectotype, selected here).

Poa [unranked] *Stoloniferae* Fries ex Lange, Haandb. Danske Fl. 75. 1851. TYPE: *Poa pratensis* L. (lectotype, selected here).

Poa sect. *Cenisia* Ascherson & Graebner, Syn. Mitteleur. Fl. 404. 1900. TYPE: *Poa cenisia* Allioni.

Poa [unranked] *Glareosae* Hegetschweiler, Fl. Schweiz 86. 1838. TYPE: *Poa distichophylla* Gaudin (= *P. cenisia* Allioni) (lectotype, selected here; see section C, above). [The lectotype proposed by Keng (1959: 203) is rejected here because *Poa polycolea* Stapf was not among the original elements.]

Poa [unranked] *Pratenses* Hegetschweiler, Fl. Schweiz 81. 1838. Nom. superfl. TYPE: *Poa pratensis* L.

Poa sect. *Incanae* V. Jirásek, Věstn. Král Ceské. Společn. Nauk, Tř. Mat.-Přír. 2: 4. 1935. Nom. superfl. (included two previously published legitimate sections). TYPE: *Poa cenisia* Allioni (lectotype, selected here).

Poa sect. *Obsoletae* Rouy, Fl. France 14: 267. 1913. TYPE: *Poa pratensis* L. (lectotype, selected here).

Poa sect. *Nervosae* Rouy, Fl. France 14: 278. 1913. TYPE: *Poa cenisia* Allioni (lectotype, selected here).

Poa sect. *Spizopoa* Dumortier, Observ. Gramin. Belg. 110, 111. 1823. TYPE: *Poa pratensis* L. (lectotype, selected here).

Poa sect. **Homalopoa** Dumortier, Observ. Gramin. Belg. 110, 113. 1823. TYPE: *Poa chaixii* Villars (lectotype, designated by Hermann (1939: 457)).

Synonyms:

Poa [unranked] *Silvaticae* Hegetschweiler [1838: 80, providing the description] ex Nyman, Consp. Fl. Eur., part 4, 833. 1882. TYPE: *Poa silvatica* Chaix [non. Pollich] (≡ *P. chaixii* Villars).

Poa sect. *Diversipoa* V. Jirásek & Chrtek, Preslia 34: 65. 1962. TYPE: *Poa chapmanniana* Scribner.

Poa sect. **Dioicopoa** (E. Desvaux) Bentham, 1881: 125. Basionym: *Poa* [unranked] *Dioicopoa* E. Desvaux, Fl. Chil. 6: 413. 1853. *Poa* subg. *Dioicopoa* (E. Desvaux) J. R. Edmondson, J. Linn. Soc., Bot. 331. 1978. TYPE: *Poa chilensis* Trinius (= *P. denudata*) (lectotype, designated by Keng (1959: 163)).

Poa sect. **Madropoa** Soreng, Syst. Bot. 16: 512. 1991. TYPE: *Poa piperi* Hitchcock.

Poa subsect. **Epiles** Hitchcock ex Soreng, Syst. Bot. 16: 512, 513. 1991. *Poa* [unranked] *Epiles* Hitchcock, Man. Grasses U.S. 129. 1935. Nom. inval., description in English. TYPE: *Poa epilis* Scribner.

Poa subsect. **Madropoa** Soreng, Phytologia 71: 410. 1991. TYPE: *Poa piperi* Hitchcock.

(cpDNA group V)

Poa sect. **Pandemos** Ascherson & Graebner, Syn. Mitteleur. Fl. 425. 1900. TYPE: *Poa trivialis* L.

Synonyms:

Poa [unranked] *Hydrophilae* Hegetschweiler, Fl. Schweiz 81. 1838. TYPE: *Poa trivialis* L. (lectotype, selected here; see section C, above).

Poa [unranked] *Fasciculiferae* Fries ex Lange, Haandb. Danske Fl. 74. 1851. TYPE: *Poa trivialis* L. (lectotype, selected here).

Poa [unranked] *Neurantha* K. Koch, Linnaea 21: 405. 1848. TYPE: *Poa trivialis* L.

Poa sect. *Coenopoa* Hylander, Bot. Not. 3: 354. 1953. Nom. superfl. TYPE: *Poa trivialis* L.

Poa sect. **Abbreviatae** Nannfeldt ex Tzvelev, Novosti Sist. Vyssh. Rast. 11: 30. 1974. TYPE: *Poa abbreviata* R. Brown.

Poa sect. **Tichopoa** Ascherson & Graebner, Syn. Mitteleur. Fl. 419. 1900. TYPE: *Poa compressa* L.

Poa sect. **Oreinos** Ascherson & Graebner, Syn. Mitteleur. Fl. 400. 1900. TYPE: *Poa laxa* Haenke.

Poa sect. **Stenopoa** Dumortier, Observ. Gramin. Belg. 110, 112. 1823. TYPE: *Poa nemoralis* L. (lectotype, designated by Tzvelev (1972: 50)).

Synonyms:

Poa [unranked] *Nemorales* Hegetschweiler, Fl. Schweiz 83. 1838. TYPE: *Poa nemoralis* L.

Poa [unranked] *Caespitosae* Fries ex Lange, Haandb. Danske Fl. 51. 1851. TYPE: *Poa nemoralis* L. (lectotype, selected here).

Poa sect. *Glaucopoa* Ascherson & Graebner, Syn. Mitteleur. Fl. 405. 1900. TYPE: *Poa caesia* Smith.

Poa sect. *Hylopoa* Ascherson & Graebner, Syn. Mitteleur. Fl. 406. 1900. Nom. superfl. TYPE: *Poa nemoralis* L.

Poa sect. **Bolbophorum** Ascherson & Graeb-

ner, Syn. Mitteleur. Fl. 391. 1900. TYPE: *Poa bulbosa* L. [lectotypification on *P. alpina* L., by J. R. Edmondson (1978: 331), is rejected in section C, above].

Synonyms:

Poa [unranked] *Arenariae* Hegetschweiler, Fl. Schweiz 87. 1838. TYPE: *Poa bulbosa* L. (lectotype, selected here).

Poa subsect. *Bulbosae* V. Jirásek, Věstn. Král Ceské. Společn. Nauk, Tř. Mat.-Přír. 2: 3. 1935. TYPE: *Poa bulbosa* L.

Poa ser. *Bulbosae* Roshevits, Fl. URSS 2: 375. 1934. TYPE: *Poa bulbosa* L.

Poa sect. **Secundae** V. L. Marsh ex Soreng, Syst. Bot. 16: 511, 523. 1991. TYPE: *Poa secunda* J. Presl.

Poa subsect. **Halophytae** V. L. Marsh ex Soreng, Phytologia 71: 410. 1991. TYPE: *Poa unilateralis* Scribner.

Poa subsect. **Secundae** Soreng, Phytologia 71: 410. 1991. TYPE: *Poa secunda* J. Presl.

Synonyms:

Poa [unranked] *Nevadenses* Hitchcock, Man. Grasses U.S. 136. 1935. Nom. inval., description in English.

Poa [unranked] *Scabrellae* Hitchcock, Man. Grasses U.S. 134. 1935. Nom. inval., description in English.

E. Two New Species

Poa chambersii Soreng, sp. nov. TYPE: U.S.A. Oregon: W side of Cascade Mountains, 15 mi. SW of Oakridge, SE "Lane Co., Fairview Mountain, T. 23 S., R. 1 E., Sec. 11, 5900 ft, northwest side of the summit peak, . . . on steep open slope in pockets of soil on shelving rock. . . . Pistillate and staminate plants in separate clumps," 9 July 1993, *K. L. Chambers 5746* (holotype, US; isotypes, K, OSC, WTU). Figure 1.

A *Poa cusickii* subsp. *purpurascente* rhizomatibus praesentibus, laminis omnibus planis (non involutis) laevibus sine pilis adaxialibus, floribus sexualiter fungentibus, dioeciis (non apomicticto-pistillatis cum antheris omnibus vestigialibus), plantarum staminatarum floribus antheris 1.8–3.7 mm longis praeditis differt.

Dioecious or gynodioecious; perennial, rhizomatous, branching extravaginal; culms from sparse tufts, often decumbent at the base, old sheaths persisting at base, 10–50 cm tall, with 0–2 nodes exposed; leaf sheaths weakly keeled, those of the uppermost culm leaves closed ca. ⅓–⅞; ligules of uppermost culm leaves 0.5–2.0(–2.5) mm long, truncate to rounded, adaxially smooth; leaf blades 2.0–5.0 mm wide, moderately firm, flat or folded, those of the culm less than 8 cm long, the basal culm blades vestigial, the innovation blades flat, smooth and glabrous on both surfaces; panicle 2–9 cm long, loosely contracted, lanceolate to ovoid, erect, few-flowered (fewer than 30 spikelets), the branches 1–2 per node, ascending to little spreading, naked below, smooth or very sparsely scabrous, less than 3.5 cm long; spikelets with 2–7 florets, 6–12 mm long; glumes, 3-veined, 3.5–4.5 mm long, ⅗–⅘ the length of adjacent lemmas; callus sparsely webbed on at least some florets, infrequently all glabrous; lemmas 5–7 mm long, glabrous or villous on the keel and marginal veins over the lower ¼, 5–7-veined; palea keels very sparsely scabrous; rachillas glabrous or sparsely scabrous; flowers unisexual; anthers 1.8–3.7 mm long in males and less than 1 mm long and early abortive in females; caryopses ca. 2 mm long, laterally compressed, flat adaxially, weakly keeled abaxially, yellowish brown, glabrous, endosperm solid, hilum round, ca. 0.3 mm diam.; lodicules two, ca. 0.6 mm long, broadly lanceolate, with a lateral lobe, glabrous.

The Steens Mountain plants are gynodioecious (vs. dioecious), somewhat tufted (vs. forming loose turf), with culms 10–33 cm tall (vs. 15–50), nodes exposed 0–1 (vs. 1–2), sheaths closed ⅓–⅔ their length (vs. ½–⅞), panicles 2–7 cm long (vs. 4–9), lemma calluses rarely webbed (vs. usually with a sparse, short web on at least some florets). They appear to represent a gynodioecious and more alpine race of the same species.

Distribution. Rich subalpine slopes, west side of the Cascade Mountains and alpine slopes of the Steens Mountain in Oregon. The species is at best infrequent in occurrence and probably should be considered rare.

The new species is named in honor of Kenton L. Chambers, Oregon botanist, teacher (from whom I took agrostology), and collector of the type.

Poa chambersii is considered to be a member of the *P. nervosa* complex. It is similar to those species but has smooth branches and a more condensed inflorescence. The other species (see list under *P. arnowiae* in section E, below) are partially gynodioecious, or, in the case of *P. rhizomata* Hitchcock, subdioecious. In the Cascade Mountains, *P. chambersii* appears to be dioecious, with an equal number of plants with fertile stamens and without them, but more detailed study of seed development and sex-ratios in the field are needed to confirm this. Population samples collected by D. H. Mansfield

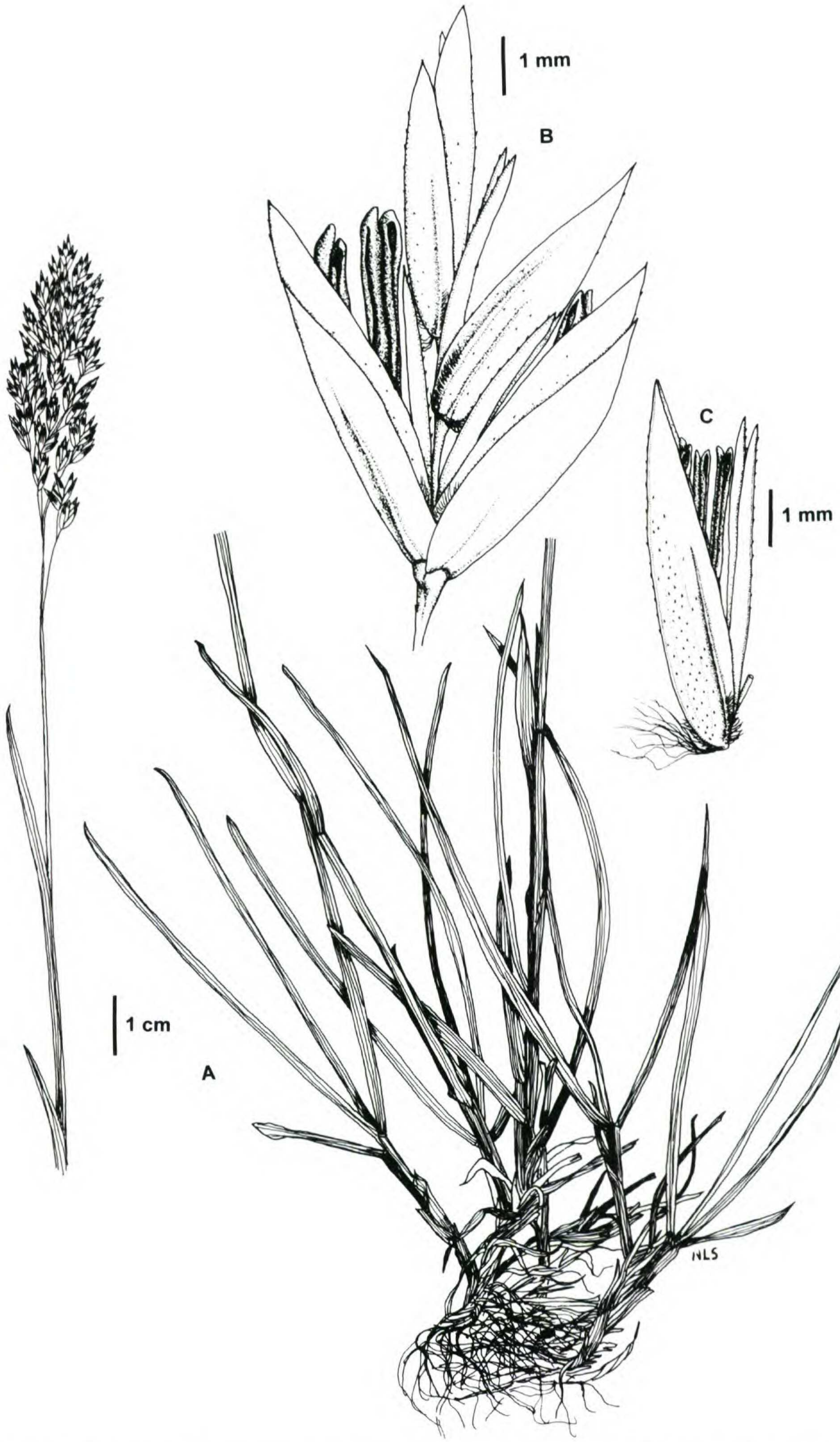

Figure 1. *Poa chambersii* Soreng, illustrated from an isotype collection (*K. L. Chambers 5746*, OSC). —A. Habit. —B. Spikelet. —C. Floret.

from the Steens Mountains yielded sex-ratios of 10 pistillate to 35 perfect-flowered individuals (*95-75a*), and 9 pistillate to 21 perfect-flowered individuals (*95-78a*), indicating gynodioecy occurs in that region.

The origin of the new species also requires additional study. The species was postulated to have been one of the parents of *Poa cusickii* Vasey subsp. *purpurascens* (Vasey) Soreng, with *P. cusickii* subsp. *epilis* (Scribner) W. A. Weber being the other (Soreng, 1986; discussed as a form of *P. rhizomata*). *Poa chambersii* is marginally distinct from *P. cusickii* subsp. *purpurascens* (Vasey) Soreng except that it is rhizomatous and sexually reproducing (producing staminate, hermaphroditic, and pistillate individuals, vs. strictly pistillate and apomictic) and has blades that are mainly flat and smooth (never involute and hairy above). Most material of *P. cusickii* subsp. *purpurascens* is caespitose, but some collections exhibit short lateral shoots, and a few clearly have rhizomes (e.g., Oregon: Marion Co., Breitenbush Lk., *Peck 18734* (WILLU)). Most of the latter plants, however, have innovation blades that are involute and hairy to scabrous adaxially on and between the veins, and all plants are pistillate (herbarium sample size = 132 distinct specimens). Considering the evidence of intermediacy between *P. chambersii* and *P. cusickii* s.l., it might seem preferable to treat the new taxon as a subspecies of *P. cusickii.* However, the postulated independent origins of these taxa, putatively in different sections, makes this solution unsuitable.

The new species has been confused in herbaria with *Poa rhizomata* (specifically the *Baker* collections, see paratypes below), but its ligules are shorter (0.5–2.5 mm vs. 2–8 mm), sheaths more closed (⅓–)½–⅞ (vs. ⅓–½), culm blades mostly flat, 2.0–5.0 mm wide, the longest less than 8 cm in length, the apex broadly acute and smooth (vs. folded, 2.0–2.5 mm wide, the longest usually over 10 cm in length, the apex narrowly acute and scabrous), floret pubescence sparser or absent, the lemma keel sometimes glabrous, the callus web sparse and short or absent, the panicles loosely contracted, ovoid, erect, branches smooth or very sparsely scabrous (vs. open, nodding, the branches moderately densely scabrous), functional anthers 1.8–3.7 mm long (vs. 2.5–4). The Steens Mountains populations approach *P. stebbinsii* Soreng, except that plants are rhizomatous (vs. caespitose), the ligules are shorter and milky white (vs. long and hyaline), and the blades are flat and short (vs. involute and elongate), and the panicles are smooth (vs. scabrous).

Paratypes. U.S.A. **Oregon:** Lane Co., Fairview Mountain, E slope, Calapooya Range, open rocky soil, 4 July 1948, *W. H. Baker 5545* (OSC ♀, ♂, WILLU ♀, US♀); Fairview Mountain, Bohemia District, 14 July 1940, *Baker 1898* (ID ♂), *Baker 1896* (ID ♂), *Baker 1897* (ID ♂), N slope, *Baker 1934,* (ID ♀), on top, *Baker 1888* (ID ♂); McKenzie Pass, 7 mi. W of summit of Cascade Mountains, 7 Aug. 1920, *M. E. Peck 9823* (WILLU ♀); White Branch, stream bank, T. 16 S., R. 7 ½ E. Sec. 12, 3370 ft., 26 July 1938, *L. E. Detling 3370* (ORE ♀); Harney Co., Steens Mountains, Kieger Rim, 8000 ft., 3 Aug. 1992, *D. H. Mansfield 92-254,* Little Blitzen Cirque, 8600 ft., 17 Aug. 1992, *92-666,* 8700 ft., 18 Aug. 1992, *92-807,* 8960 ft., 28 July 1992, *92-126,* Little Blitzen Cirque, 9000 ft., dry rocky benches, 21 Sep. 1995, *95-76a,* moist ground adjacent to receding snow banks *95-75a, 95-78a* (all CIC, see population sex ratios above).

Poa arnowiae Soreng, sp. nov. TYPE: U.S.A. Utah: Utah Co., Provo, 8000 ft., 3 July 1894, *M. E. Jones 5573* (holotype, US-914888 [with a fragment of the type of *P. curta* Rydberg, *Tweedy 13* (ex NY)]; isotypes, DAV, GH, NY, RSA-100264, UC-157763, US-278718, WTU). Figure 2.

A *Poa wheeleri* [typum *P. curtae* Rydbergii, non auctor, includente] paniculis internodiis basalibus (3.5) 4–9 (13) cm longis, ramis plerumque deflexis, laminis planis sine pilis adaxialibus, vaginis et ligulis non dense scabris, pilis retrorsis carentibus, plantis partialiter gynodioeciis, floribus aliquis vel omnibus hermaphroditis, infrequenter omnibus pistillatis differt.

Partially gynodioecious; perennial, short rhizomatous; culms loosely tufted or solitary, erect or decumbent, 15–80 cm tall; leaf sheath smooth to sparsely scabrous, glabrous, keeled, the margins of the uppermost culm leaves closed ½–$^{9}/_{10}$ their length; ligules 0.5–4 mm long, smooth or very sparsely scabrous abaxially, truncate to obtuse, the lower ones erose; culm leaf blades 2.5–6 mm wide, flat, smooth or sparsely scabrous adaxially and abaxially, glabrous, those of the uppermost culm leaves mostly 2.5–6 cm long; panicle (5–)12–22 cm long, open, sparse, longest lower internodes within a plant (3.5–)4–9(–13) cm long, the branches nearly glabrous to moderately scabrous, 2–3(–4) per node, some of the lower ones eventually reflexed; spikelets strongly compressed, with 2–6 florets, 5–9 mm long; glumes ¼–¾ the length of the lower lemma, the first glume 1–3-veined, the second 3-veined; callus glabrous; lemmas 3–6.5 mm long, glabrous, sparsely hirsutulous (infrequently the keel and marginal veins sparsely villous, but never pilose between the veins); palea keels scabrous; rachillas smooth, the distal internodes more than 1 mm long; flowers all perfect, or pistillate and perfect mixed within the same spikelet and inflorescence, or all pistillate, functional anthers (1.3–)2–3.6 mm long.

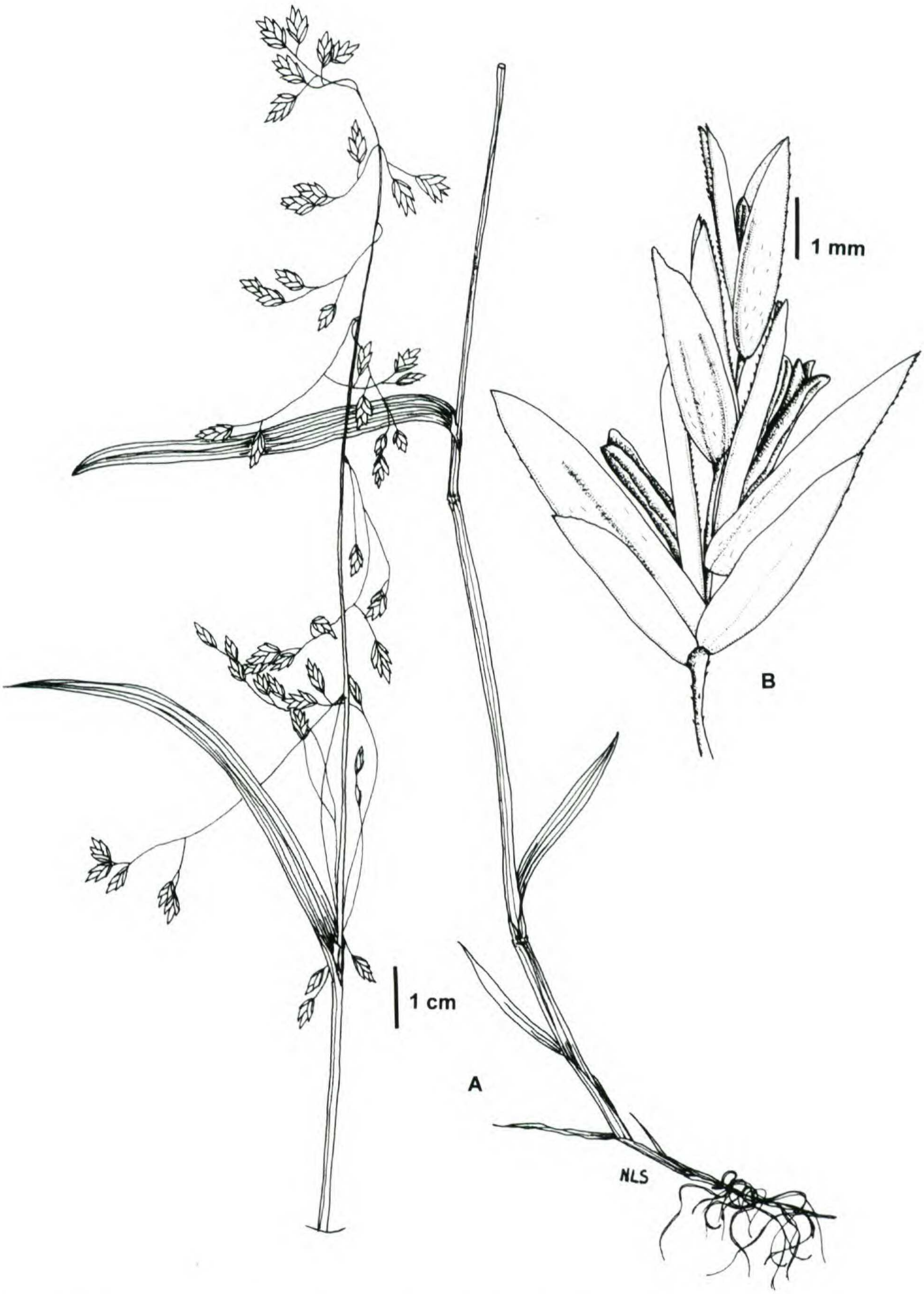

Figure 2. *Poa arnowiae* Soreng, illustrated from an isotype collection (*M. E. Jones 5573*, US-278718). —A. Habit. —B. Spikelet.

Distribution. Southeast Idaho, northern Utah, western Wyoming. Flowering late spring to mid summer. Shady slopes and margins of meadows, in rich soil, under oak, maple, aspen, and spruce/fir forests, from upper sagebrush to subalpine, 1500–3300 m.

The type specimen of *Poa curta* Rydberg (Wyoming: Teton Co., Spread Cr., 9800 ft. [2900 m], July 1897, *F. Tweedy 13* [holotype NY]) has uppermost culm sheaths 46% closed, lower culm sheaths moderately densely retrorsely pubescent, their ligules ca. 1 mm long and pubescent; panicles 5.2–6.3 cm

long, lowest internodes 1.2–2.1 cm long, branches mostly ascending, flexuous, less than 2 cm, moderately scabrous on the angles, peduncles 18–19 cm long; spikelets to 6 mm long; florets all pistillate, the lemmas more or less evenly and sparsely scabrous. It is fully within the range of characteristics of *P. wheeleri* Vasey.

In *Poa* sect. *Homalopoa,* in the *P. nervosa* complex, a new description is required for *Poa curta* sensu auctore, non Rydberg (Soreng, 1985). The new species honors Lois Arnow, Utah botanist, who came to the same conclusion independently that the type of *Poa curta* Rydberg belongs to *P. wheeleri* Vasey [*P. nervosa* var. *wheeleri* (Vasey) C. L. Hitchcock], and not to *P. curta* in the sense of other authors. She presented a detailed description (slightly narrowed here to eliminate what I consider to be characteristics of hybrid individuals) and discussed the need for a new name (Arnow, 1987: 764, 767). *Poa wheeleri* and the type of *P. curta,* unlike *P. arnowiae,* have a more densely tufted habit, retrorsely puberulent to scabrous sheaths and ligules, the sheaths often more open, innovation blades folded and hairy above, panicles with internodes mostly less than 4 cm long, the branches ascending or spreading (infrequently reflexed). *Poa wheeleri* produces seed apomictically and autonomously, normally producing only pistillate flowers. *Poa arnowiae* apparently is sexually reproducing and partially gynodioecious, usually producing pollen-bearing anthers, some plants with all flowers perfect and others bearing a mixture of perfect and pistillate flowers, infrequently all flowers on an inflorescence (or possibly a whole plant) pistillate. The two taxa apparently occasionally hybridize (Arnow, 1987; e.g., *L. Arnow 6122* [UT]), but for the most part are readily distinguishable.

Poa arnowiae belongs to a group of partially gynodioecious species, the *P. nervosa* complex. Other members of the complex are *P. cuspidata* Nuttall from the central Appalachian Mountains, *P. tracyi* Vasey from the Southern Rocky Mountain Front Ranges, and *P. nervosa* (Hooker) Vasey, *P. rhizomata* Hitchcock, and *P. chambersii* Soreng from west of the Cascade Mountains. There appears to be a close relationship between these species and *P. grandis* of China (see section B, above). *Poa wheeleri* is thought to have originated as a hybrid between some member of this complex and a species of section *Madropoa* Soreng, *P. cusickii* being the most likely candidate (Soreng, 1991a).

Paratypes. U.S.A. **Idaho:** Teton Co., Victor, damp shaded soil near a stream, 11 July 1901, *Merrill & Wilcox 213* (US). **Utah**: Wasatch Mountains, Manti Natl. Forest, Trinkler's Station, moist meadow, 8300 ft., 18 July 1908, *W. C. Clos 71a* (WIS). Cache Co., Pine Canyon, 5600 ft., 20 May 1932, *Burke 2887* (UTC); Bear River Range, West Hodges Pastures, 4 Aug. 1936, *Allen & Harris s.n.* (BH); vicinity of West Hodges Pasture, 8 June 1939, *Gessel & Killpack s.n.* (UTC); ridge S of High Cr., Lions Grove Camp Ground, 6 May 1966, *D. Hatch 127* (UTC); Spring Hollow, 8000 ft., 20 May 1934, *Maguire 13213* (BH, UTC); Spring Hollow, 7500 ft., 27 May 1939, *Maguire 16727* (UTC); Spring Hollow Trail, Mount Logan, 9000 ft., 25 May 1940, *Maguire 18605a* (UTC, NY); Tony Grove Canyon, 7000 ft., 26 May 1939, *Maguire 16704* (UTC); Cache Natl. Forest, Tony Grove, black loam, 6600 ft., 1 Aug. 1932, *Pickford & Pechanec 175* (US). Carbon Co., Scofield, 24 June 1904, *M. E. Jones 11149* (US); Eccles Canyon, ca. 4 mi. NW of Clear Cr., 8500 ft., 5 July 1979, *Welsh & Moore 18798* (BRY). Davis Co., head of Centerville Canyon, 8000 ft., 16 June 1936, *A. Hull* (US). Duchesne Co., Currant Cr., above dam, 1 June 1972, *Brotherson 1762* (BRY); Uintah Mountains, High country, at head of Blind Stream, rocky slope near summit of ridge, 10,500 ft., 3 July 1938, *Harrison & Nisson 8797* (US, mixed with *P. wheeleri*); Wolf Cr. Pass, among aspens, E slope of pass, 9000 ft., 16 June 1933, *E. H. Graham 8144* (US). Jaub Co., near spring, McCune Cr., Mount Nebo, 11 June 1937, *Bierisch 305* (UTC); Jaub or Salt Lake Co., Nebo Forest, 6000–8000 ft., 16 July 1913, *J. Barnett, U.S.F.S.# 116* (US). Lincoln Co., *Shultz & Shultz 2621* (NY). Salt Lake Co., Big Cottonwood Canyon, 7400 ft., 28 June 1983, *L. Arnow 6104* (UT); Big Cottonwood Canyon, 8600 ft., 6 Aug. 1983, *L. Arnow 6145* (NY, UT); Dry Cr. Canyon, 26 June 1983, *L. Arnow 6098* (UT); Mill Cr. Canyon, 8000 ft., 9 July 1983, *L. Arnow 6109* (UT); Alta, 20 Aug. 1883, *M. E. Jones* (RM, RSA); Wasatch Mountains near Salt-Lake City, 5000 ft., May 1869, *S. Watson 1316* (US); Big Cottonwood Canyon, below Silver Lk., 8 July 1905, *P. A. Rydberg 6778* (US). San Pete Co., *Lewis 4941* (NY); mountains E of Gunnison, 8500 ft., 28 June 1875, *L. F. Ward 296* (US 3 duplicates); Fairview Canyon, Skyline Rd., 8200 ft., 21 June 1977, *Clark 2556* (BRY). Silver Co., ridge NE of Musinia Ranger Station, 9000 ft., 29 June 1962, *Jeffery s.n.* (UTC). Utah Co., Mount Timpanogas, *Lewis 917* (NY); Provo, 1887, *S. M. Tracy 415* (US). Wasatch Co., *Brotherson & Blauer 44* (NY), *Blauer & Brotherson 73* (NY), *L. F. Ward 33, 296* (NY), *S. L. Hatch 1056* (CAN), *Lenard 186* (NY), *Maguire 17524* (NY), *Reiff s.n.* (NY); head of Wolf Cr., 9500 ft., 24 June 1926, *E. J. Adair 23* (US); Wolf Cr., 9000 ft., 6 June 1926, *E. J. Adair 10* (US); N of Wolf Cr. Summit, 13 Aug. 1980, *Soreng & Spellenberg 1358a & 1362b* (both NMC). Weber Co., Cache Valley Cr., 6500 ft., 14 June 1983, *L. Arnow 6095* (UT); Ogden, 7800 ft., 1 Aug. 1899, *L. H. Pammel s.n.* (US); Ogden, 1887, *S. M. Tracy 356* (US). **Wyoming:** Jackson Hole, Cache Cr., 23 July 1926, *A. S. Hitchcock 23118* (US; toward *P. wheeleri* in shorter inflorescences, to 11 cm long, and shorter inflorescence internodes, to 3.5 mm long, but with reflexed branches, nearly smooth sheaths, and looser habit).

F. New Names and Combinations in *Poa, Puccinellia,* and *Dissanthelium*

Poa unilateralis subsp. **pachypholis** (Piper) D. D. Keck ex Soreng, comb. et stat. nov. Basionym: *Poa pachypholis* Piper, Proc. Biol. Soc. Wash. 18: 146. 1905. TYPE: U.S.A. Washington: Pacific Co., Ilwaco, ocean bluffs, 22 June 1904, *C. V. Piper 4900* (holotype, US-556775; isotypes, US-3151666, US-748809, US-923750).

Lemma keels pilose for ½–¾ the length, marginal and lateral veins pilose for about ⅓ the length, the callus of some florets within spikelets with hairs 0.2–0.5 mm long distributed around the base. Chromosome number $2n = 42$.

Distribution. United States: Oregon (Newport, *Peck 1613E*), and Washington (Pacific Co., type locality).

Poa unilateralis subsp. *unilateralis* differs from subspecies *pachypholis* in that it has lemmas that are glabrous to ciliate on the margins, rarely sparsely pilose on the keel and marginal veins near the base, and glabrous between the veins, and also has calluses that are glabrous or infrequently with a minute crown of hair to 0.3 mm long. Its chromosome numbers are $2n = 42$, and 84. It has a more southerly distribution: United States: California (south to Monterey Co.) and Oregon (north to Tillamook Co., Netarts Bay).

Poa alpina L. × **Poa pratensis** L. s.l.

Poa ×gaspensis Fernald (pro sp.) Rhodora 31: 46. f. 1. TYPE: *Fernald & Collins 344* (holotype, GH; isotype, BH).

Perennial; culms from dense to loose tufts, erect or decumbent at the base, caespitose (rhizomatous or appearing rhizomatous in slumping soils), 15–50 cm tall; leaf sheaths of the uppermost culm leaves closed ¼–½, new shoots intra- and extravaginal, the old sheaths persisting; ligules 2–6 mm long, obtuse to acute; blades 1.5–3.5 mm wide, thin, flat; panicle 3–12 cm long, narrowly ovoid to lanceolate, erect, densely flowered, the branches 2–4 per node, ascending to spreading, flowered from above the middle, sparsely scabrous; spikelets with 3–4 florets, 3.5–6.0 mm long; glumes, the lower 3-veined, broadly lanceolate, sharply keeled, distinctly scabrous on the upper ⅓ of the keels; callus short webbed; lemmas 2.5–4.5 mm long, villous on the keel, lateral and marginal veins, puberulous between the veins; palea keels villous, glabrous between the keels; flowers perfect, anthers 1.2–1.4 mm long.

Distribution. Rocky or gravelly shores and slopes: Canada: Quebec (Gaspe Peninsula) south to Newfoundland (Labrador).

Poa ×gaspensis is a problematical taxon of suggested hybrid origin in the original publication (*P. alpina* × *P. alpigena*). It differs from *P. alpina* in its extravaginal branching and presence of a web; from *P. pratensis* in its acute ligules and more pubescent lemmas; from *P. arctica* in its sharply keeled and more scabrous glumes. It is quite variable in form, with traits appearing to segregate in various combinations toward the putative parents. It does produce seed as well as spread vegetatively. This would be the same hybrid combination as *Poa ×herjedalica* H. Smith, which has a suggested origin from *P. alpina* × *P. pratensis* s.l., but that taxon of northern Europe is strictly viviparous and more rhizomatous, and thus I hesitate to call it that.

Poa tovari Soreng, nom. nov. Replaced name: *Poa geniculata* Tovar, Publ. Mus. Hist. Nat. Lima, Ser. B. Bot. 32: 8. 1984; non *Poa geniculata* Durieu, Expl. Sci. Algerie 2: pl. 40, f. 4. 1849. TYPE: Peru. La Libertad: Prov. Contumaza, cerca Usquil, 3100 m, *E. Anderson 1265* (holotype, US-2012876; isotype, US-2012877).

The new name honors Óscar Tovar, Peruvian agrostologist, who originally described the species.

Puccinellia atacamensis (Parodi) Soreng, comb. nov. Basionym: *Poa atacamensis* Parodi, Revista Argent. Agron. 29: 18. 1963. Nom. nov. Replaced name: *Poa nana* Philippi, Anales Mus. Nac. Chile Bot. 8: 87. 1891; non *Poa nana* Savi, Ann. Bot. (Usteri) 24: 49. 1800. TYPE: Chile. Ad Machua in aquis cresit [Tarapaca], *Philippi* [*396*] (type, fragment US-88754).

This species belongs in *Puccinellia.* It has the generic diagnostic features of hard opaque caryopses with oval hila (somewhat larger than in *Poa*), short broadly obtuse glumes, papillae over much of the epidermis, and open culm sheaths.

Dissanthelium atropidiforme (Hackel) Soreng, comb. nov. Basionym: *Poa atropidiformis* Hackel, Svenska Exped. Magell. 3(5): 224. 1900. TYPE: Chile. [Isla Grande de Tierra del Fuego] Hab. Fuegia Orientalis, Rio Cullen, Paramo, [1896 or 1897], *Bruno Ansorge s.n.* (type, fragment US-89697).

Dissanthelium atropidiforme var. **patagonicum** (Parodi) Soreng, comb. nov. Basionym: *Dissanthelium patagonicum* Parodi, Physis (Buenos Aires) 8: 80. f. 7. 1925. *Poa atropidiformis* var. *patagonica* (Parodi) Nicora, Darwiniana 18: 97. 1973. TYPE: Argentina. Santa Cruz: [Rio Gallegos], 24 Dec. 1922, *L. Dauber 180* (holotype, BA; isotypes, SI, US-2947335).

Spikelets of *Poa atropidiformis* var. *patagonica* are barely distinguishable from *Dissanthelium californicum* (Nuttall) Bentham. The former is, how-

ever, a tufted perennial with sclerophyllous leaves, and the latter is a slender annual with soft lax leaves. *Poa atropidiformis* var. *atropidiformis* has glabrous lemmas but is otherwise indistinguishable from variety *patagonica.* I believe *P. atropidiformis* is closer to other species of *Dissanthelium* than to any in *Poa.* Although both species infrequently have a web on the dorsal side of the callus, like that in *Poa,* I have seen a web in other species of *Dissanthelium* as well. The leaf blades of *Dissanthelium* are also like those in *Poa* in having only two grooves on the adaxial surface. In addition, the caryopses of *Dissanthelium* are hard and translucent, and have a punctiform hilum, as in *Poa.* In view of these features, it seems likely that *Dissanthelium* is either a sister group to *Poa* or an offshoot of it, and that the characteristic of glumes longer than the lowermost floret is once again found to be homoplasious between Poeae and Aveneae. It should be noted that several species of *Poa* also have glumes that are longer than their adjacent florets as in *Dissanthelium.*

Dissanthelium calycinum subsp. **mathewsii** (Ball) Soreng, comb. et stat. nov. Basionym: *Deschampsia mathewsii* Ball, J. Linn. Soc., Bot. 22: 60. 1885. *Dissanthelium mathewsii* (Ball) R. C. Foster & L. B. Smith, Phytologia 12 (5): 249. 1965. TYPE: Peru. Above Caspalta, 14000–14300 ft., 22 Apr. 1882, *J. Ball s.n.* (holotype, K, fragment US-908709 ex K; isotype, GH not seen).

Dissanthelium sclerochloides Steudel ex E. Fournier, Mexic. Pl. 2: 112. 1886. TYPE: Mexico. Nevado de Toluca, 1865–1866, *M. Hahn s.n.* (lectotype selected here, P, fragment US; isolectotype, P). SYNTYPES: Mexico. San Luis Potosi, *Vierlet d'Aoust 1435* (P, fragment US ex P); Chile. *Lechler 1832* (P).

Having examined all the *Dissanthelium* material at US I found it apparent that *D. calycinum* and *D. mathewsii* (including *D. sclerochloides*) overlap in their diagnostic features. The Mexican plants (previously known as *D. sclerochloides*) extend slightly into the morphological range of *D. calycinum* as delimited by Swallen and Tovar (1965) and Tovar (1993), and the Peruvian plants overlap well into the morphological range of the Mexican plants. However, considered together, the plants clearly exhibit a bimodal pattern of variation. All the Mexican material is considered to be subspecies *mathewsii.* Both subspecies are present in the Andes, but there subspecies *calycina* is the more common. Of the three specimens available for lectotypification of *D. sclerochloides,* the *Hahn s.n.* collection with the binomial written in Fournier's hand (the script verified by A. Lourteig, pers. comm.) is selected for the lectotype. The second *Hahn s.n.* collection was not annotated by Fournier, and the *Vierlet d'Aoust 1435* collection, although annotated by Fournier, is scanty and is mixed with *Poa annua.*

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